

# **Nevada Bureau of Air Pollution Control**

## **General Air Dispersion Modeling Guidelines**

**Rev. September 2013**



## I. INTRODUCTION

This document provides general guidelines to individuals preparing to submit modeling protocols and air dispersion models in support of air quality permit applications. An air quality modeling analysis (e.g., dispersion modeling demonstration) is required by the NBAPC and many other air quality management agencies to assess the likely air quality impacts from operations at a stationary source, and to show whether the stationary source will be able to operate in compliance with applicable ambient air quality standards under the proposed permit conditions. An air quality modeling analysis is an integral part of the environmental evaluation requirement in NAC 445B.308. The air dispersion modeling impact assessment provides the technical basis for NBAPC decision-making with respect to the issuance of stationary-source air quality permits.

## II. MODELING PROTOCOLS

Prior to performing and submitting an air quality modeling analysis, the Nevada Division of Environmental Protection-Bureau of Air Pollution Control (NBAPC) recommends that the applicant prepare and submit a modeling protocol prior to submitting the actual permit application and environmental evaluation. A modeling protocol is a detailed plan on how the applicant intends to perform an air dispersion modeling analysis, which is the primary component of the overall environmental evaluation submitted with an air quality permit application. When renewing permits, applicants are bound by regulation to submit complete applications within certain specified timeframes. As such, we recommend that permit holders submit modeling protocols well ahead of the statutory deadlines in which Class I and Class II permit renewal applications are to be submitted.

There is no regulatory timeframe the NBAPC has to meet for review of modeling protocols. The NBAPC recommends that applicants plan for a 30-day review period, once the protocol is received by the NBAPC. Subsequent to the review, the NBAPC will issue a letter to the applicant that includes comments and recommendations on how the modeling analysis might be improved, and/or to specify concurrence with individual components of the applicant's modeling approach.

Although submission of a modeling protocol is optional, the applicant benefits from a preliminary review of their modeling approach by the NBAPC, because problems can be vetted and corrected prior to submittal of a formal permit application.

We remind all applicants that submission of an incomplete or inconclusive modeling analysis may result in the NBAPC either deeming the application incomplete, or denial of the permit application.

The NBAPC is prohibited from approving an air quality permit application if, after independent review of the environmental evaluation and modeling analysis, it determines that operation of the stationary source, under the proposed permit conditions, will result in a negative air quality impact. A negative air quality impact is defined as an exceedance of any applicable air quality standard, as demonstrated through dispersion modeling or direct measurement of the concentrations of regulated pollutants in ambient air.

As part of the technical review of a permit application, the NBAPC performs an internal critique of all modeling analyses, prior to making a final decision on whether to issue or deny an application for an air quality permit. The applicant must provide all required information so that the NBAPC can perform its own independent modeling analysis. The required information includes, but is not limited to, the following:

- A proposed emission inventory of all regulated air pollutants including those from insignificant activities;
- Stack parameters (e.g., height, diameter, flowrate, temperature, location)
- Locations of emission units in Universal Transverse Mercator (UTM, meters, NAD 83) coordinates;
- Facility plot plans (with scale bar and north arrow);
- Building locations (in UTM) and dimensions;
- The coordinates of the property fenceline and/or property boundary limits (in UTM);
- Terrain features (Digital Elevation Models, DEMs);
- Raw and processed meteorological data.
- Digital modeling files (AERMOD input/output files, ancillary files generated during modeling).

The NBAPC does not provide training on air dispersion modeling. It is the applicant's responsibility to understand and follow correct modeling procedures and to know how to use the appropriate regulatory dispersion models. Therefore, the time and expense of preparing an environmental evaluation is the obligation of the applicant.

### III. MODELING OF PSD CLASS I (PSD-MAJOR STATIONARY SOURCE) FACILITIES

The NBAPC recommends that applicants preparing a modeling protocol in support of a Prevention of Significant Deterioration (PSD) application should first contact the NBAPC for current application procedures and updated modeling guidance. PSD air quality analyses are handled on a case-by-case basis. The analyst is referred to the following U.S. EPA guidance document entitled, *New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting*, DRAFT, October 1990, for more information on PSD/NSR modeling. The NBAPC reminds all applicants that at least 12-months of on-site meteorological data is required for new PSD permit applications or for significant revisions to existing major stationary sources.

### IV. PSD INCREMENT TRACKING – MINOR SOURCES

Facilities located in air quality management areas triggered for PSD increment analysis are subject to more stringent modeling requirements, over and above those required to demonstrate compliance with the Nevada ambient air quality standards (AAQS). The Nevada Bureau of Air Quality Planning (NBAQP) conducts increment tracking analyses for facilities located in PSD-triggered air management areas, and the NBAQP is required by federal law to track increment consumption in these areas.

The “increment” is the maximum allowed increase in concentration of a pollutant, above an established baseline concentration. The applicant should be aware that the requirement to perform an increment tracking analysis will add additional time onto the permit review period if the facility is located in a PSD-triggered area.

### V. NAC REQUIREMENTS FOR MODELING

#### A. Modeling Threshold Requirements for New or Renewed Operating Permits:

For a new stationary source, or a renewal of an operating permit for an existing stationary source, the Nevada Administrative Code (NAC) 445B.310.1(a) requires that an environmental evaluation be provided by the applicant for all sources that emit, or have the potential-to-emit (PTE), greater than 25 tons of any one regulated air pollutant per year (25 tpy). Regulated air pollutants include PM (total particulate matter), PM<sub>10</sub> (particulate matter less than 10 microns in diameter), SO<sub>2</sub> (sulfur dioxide), NO<sub>2</sub> (nitrogen dioxide), CO (carbon monoxide), O<sub>3</sub> (ozone), VOCs (volatile organic compounds, the precursor to ozone), Pb (lead), and H<sub>2</sub>S (hydrogen sulfide).

Although an ambient standard no longer exists for PM, its total PTE is still used by the NBAPC to determine whether an environmental evaluation will be required for a pending permit action. In general, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, and CO emissions should be modeled in all cases if there is a PTE for these pollutants. Ozone impacts are determined using a U.S. EPA-approved screening technique (to be discussed below). H<sub>2</sub>S and Pb are modeled on a case-by-case basis if the facility in question has a quantifiable PTE for these pollutants.

For each 5-year permit renewal cycle, a new modeling analysis is required, because ambient background conditions, meteorological data, model source codes, and NBAPC modeling policies undergo periodic adjustments. Therefore, the permit applicant is responsible for providing a new (e.g., recent) modeling demonstration of compliance with the Nevada AAQS using the latest model source code and technical guidelines, as set forth by the U.S. EPA or the NBAPC.

When the applicant is required to provide an environmental evaluation for a new stationary source or permit renewal under NAC 445B.310, all criteria pollutants must be modeled, even those with a PTE less than 25 tpy. The applicant should refer to NAC 445B.311 (see Attachment 2) for a list of items that are to be included in an environmental evaluation. Applicants must model all sources of emissions, including those emissions from insignificant activities (e.g. emergency generators, space heaters, etc.).

**B. Modeling Threshold Requirements for Modification of an Existing Operating Permit:**

For a proposed modification to an existing stationary source, NAC 445B.310.1.(b) requires that an environmental evaluation be provided if the proposed modification(s) will increase the emissions of any one regulated pollutant (including PM) by greater than 10 tons per year, and if the facility-wide PTE for any regulated air pollutant is greater than 25 tpy. When the applicant is required by NAC 445B.310 to provide an environmental evaluation for a modification to an existing stationary source, the modeling analysis must include all criteria pollutants, even those that increased by less than 10 tpy. The applicant must model all sources, including insignificant activities.

**C. Note to Permit Applicants Exempt from Modeling Requirements:**

If the proposed revisions to a stationary source do not trigger the 25/10 tpy thresholds for modeling, then responsibility for preparing the environmental evaluation (and the required modeling analysis) rests with the NBAPC. However, as noted previously, the applicant must provide the NBAPC with sufficient information to perform its own independent modeling analysis and environmental evaluation, and the NBAPC may request this information, upon discovery, from the applicant at any time during the application review process.

In some circumstances, the NBAPC may require an applicant to perform air dispersion modeling and prepare an environmental evaluation, even if the applicant would otherwise be exempt from having to do so. One common example of such a circumstance would be a proposed temporary source (Class II General, COLA) collocated at a facility that already has a Class I, II, or Class III Operating Permit. In this case, the NBAPC would require the Operating Permit holder to demonstrate compliance with the ambient standards when operating all the emission units at the facility, including those temporary emission units covered under the proposed COLA.

If the Operating Permit holder cannot demonstrate compliance with the Nevada AAQS when including the COLA equipment, then the NBAPC is prohibited from issuing the COLA. In this case, the applicant for the COLA will be directed to locate their temporary equipment off-site, outside the property boundary of the existing stationary source. The NBAPC will make a case-by-case determination as to the appropriate distance the COLA equipment has to be separated from the stationary source.

NBAPC policy and statutory requirements mandate that an environmental evaluation be performed, whether by the applicant or internally by the NBAPC, for all Class I and II permit actions. Therefore, if the NBAPC lacks the necessary information to perform an adequate modeling analysis, then decision-making by the NBAPC regarding whether to issue or deny a permit application may be delayed, until such time as the applicant provides the necessary information to the NBAPC.

Nevada law provides that applicants may request an exemption from the requirement to submit an environmental evaluation with the application. These requests are evaluated on a case-by-case basis (NAC 445B.310.2)

## VI. PREFERRED REGULATORY AIR DISPERSION MODEL

The current preferred/approved air dispersion model for determining short-range impacts from stationary sources is the U.S. EPA regulatory model AERMOD. The applicant is responsible for ensuring that the most recent version of AERMOD is used for modeling. Associated with this model are AERMAP (terrain processing) and AERMET (meteorological pre-processor). BPIP or BPIP-PRIME is also a component of the AERMOD package, and it is used to determine building downwash influences. The applicant is referred to the following sources of information on regulatory air dispersion modeling:

- (1) The U.S. EPA Support Center for Regulatory Atmospheric Modeling. [http://www.epa.gov/scram001/dispersion\\_prefrec.htm](http://www.epa.gov/scram001/dispersion_prefrec.htm). This website contains links for a variety of topics regulated to AERMOD and other regulatory modeling applications.
- (2) 40 CFR Part 51, Appendix W, Guideline on Air Quality Models, 70 FR 68218, November 9, 2005.
- (3) U.S. EPA AERMOD Implementation Guide, Rev. March 19, 2009

While AERMOD is a refined air dispersion model, the U.S. EPA is developing a screening-level tool called AERSCREEN. Screening-level models have some utility for the analyst, particularly in the early stages of an air quality analysis when one needs to assess the likely impact of a single source, or to determine the area of influence of a high-emitting source. However, most industrial facilities are multi-source, requiring that emissions from all sources be modeled together to determine the total air quality impact. As such, the NBAPC recommends that the applicant use AERMOD as the basis for submittal of an environmental evaluation, as screening models have very limited utility for multi-emission unit industrial sources.

The NBAPC advises applicants to follow the usage and applicability guidelines published by the U.S. EPA for AERSCREEN. Applicants wishing to use AERSCREEN in support of a permit application should obtain pre-approval from the NBAPC prior to submitting the application, so that the NBAPC can make a determination as to whether the applicant is justified in using the screening model in that particular case.

## VII. GENERAL MODELING PROTOCOL CONTENT

This section provides a general outline of the minimum requirements for preparing a modeling protocol. The protocol should contain, at a minimum, the following sections:

- ✓ Dispersion Model
- ✓ Air Pollutants Modeled
- ✓ Ozone Screening
- ✓ Emission Units and Source Types
- ✓ Meteorological Data Set and Processing
- ✓ Receptor Arrays
- ✓ Terrain Processing
- ✓ Operating Schedule
- ✓ Building Downwash
- ✓ Background Pollutant Concentrations
- ✓ Effects of Nearby Facilities
- ✓ Modeling Summary Analysis – Impact Assessment (Environmental Evaluation)
- ✓ Facility Plot Plan with Model Fenceline

In general, the environmental evaluation submitted by an applicant should follow the same outline as that above, but it should also include a discussion of air quality impacts and a statement affirming compliance with Nevada's ambient air quality standards.

•Dispersion Model: The applicant should specify AERMOD as the regulatory model and the version used. The analyst is advised that the U.S. EPA periodically updates model source codes, and the analyst is responsible for ensuring that the most recent version of AERMOD is used.

•Air Pollutants Modeled: Please note that NAC 445B.22097 contains the Nevada and Federal ambient air quality standards for criteria pollutants (see Attachment 1). Footnote A in this table states that the ambient concentrations must not be exceeded in areas where the general public has access, according to Nevada's ambient air quality standards. Therefore, all modeling analyses submitted to the NBAPC must report the highest, first-high concentration (H1H) for each pollutant and averaging time as specified by NAC 445B.22097. Please note that the Nevada ambient standards are based on the H1H standard, which does not allow any exceedances of an ambient standard in areas where the public has access.

As mentioned previously, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, and CO emissions should be modeled in all cases if there is a PTE for these pollutants. Ozone impacts are determined using a U.S. EPA-approved screening technique (to be discussed below). H<sub>2</sub>S and Pb are modeled on a case-by-case basis if the facility in question has a quantifiable PTE for these pollutants.

•**Ozone (O<sub>3</sub>) Modeling:** Ozone is a secondary pollutant formed in the atmosphere from a series of complex photochemical reactions involving VOC, NO<sub>x</sub>, and other ozone-precursor pollutants such as CO. Conservatively, ozone may be modeled by assuming 100% conversion of VOC pollutants into ozone emissions. This approach tends to over-estimate ozone emissions, because there will be a lag from the time of release of VOCs from an emission unit until the formation of ozone in the atmosphere during daylight hours (e.g., photochemical reactions require sunlight as the driving mechanism).

Alternatively, ozone emissions can be modeled using a screening technique developed by the U.S. EPA entitled, *VOC/NO<sub>x</sub> Point Source Screening Tables*, by Richard D. Scheffe. This document may be obtained from either the U.S. EPA or the National Technical Information Service (NTIS). The NBAPC currently supports use of the Scheffe screening technique to demonstrate compliance with the 1-hour ozone standard. If the initial screening analysis shows an exceedance of the Nevada O<sub>3</sub> standard, the applicant must determine how they will perform a more refined modeling analysis for ozone. In this case, the applicant will be required to submit a separate modeling protocol for ozone for review by the NBAPC.

•**Emission Units and Source Types:** The list of emission units to be modeled can be generated once the applicant has prepared the permit application forms and a spreadsheet (e.g., numerical tabulation) of all of the facility's proposed emission units and insignificant activities. All quantifiable emissions of regulated air pollutants from insignificant activities must also be modeled, in addition to permitted emission units. All sources must be modeled at their maximum emission rates. As outlined below, "downscaling" of hourly emission rates is not allowed.

The NBAPC requires that applicants model all sources in the NAD 83 UTM projection (project datum). The locations of buildings for assessment of building downwash effects must also be in the same datum as the project datum.

Horizontal stacks or capped vertical stacks should be modeled using one of the non-default options in the AERMOD Control Pathway. Alternatively, horizontal stacks and capped vertical stacks can be modeled as point sources with low exit velocities (0.001 m/s), but with stack diameters and exhaust temperatures input as if a standard vertical stack was being modeled. The applicant should specify in the modeling protocol the manner in which horizontal and capped vertical stack sources are modeled. "Pseudo-point" sources should be modeled as if they were vertical stacks, with appropriate stack heights, low exit velocities (0.001 m/s), and exhausting at ambient temperature (0 K, see below).

Point sources exhausting at ambient temperature must have 0 K input into AERMOD as the gas exhaust temperature. This is actually a flag that prompts AERMOD to adjust the exit temperature for each hour to match the ambient temperature. Most vendor-supplied graphical-user interfaces (GUIs) for AERMOD have an "ambient" toggle setting for point sources. Pseudo-point sources must also be modeled at 0 K.

The emission source types to be modeled generally include the following:

- A. Point Sources (e.g., emissions from stacks, baghouses, chimneys, exhaust fan vents, tank vents, etc.).
- B. Volume Sources (e.g., process fugitive emission sources from conveyor transfer points, ore stockpiles, ore dump hoppers, rock screens, open building roof vents and ventilation windows, etc.). The user is to follow the appropriate modeling guidance to provide the initial dimensions of the volume of the release (e.g., and values).
- C. Area Sources (e.g., surface-based emissions from landfills, waste lagoons, roadway surfaces, etc.). Area sources can also be elevated such as the emissions from an open tank surface (e.g., cold-cleaning or dipping operation).
- D. Open Pit Sources: Use this option only for modeling truly fugitive particulate emissions in open pits, such as dust from stockpiles. The NBAPC will review, on a case-by-case basis, proposals by applicants for modeling process fugitive or point sources as components of a single open-pit source.

•Meteorological Data: The applicant is to note that SCRAM has available for downloading surface meteorological data for the following locations in Nevada: Las Vegas, Reno, Ely, Elko, Winnemucca, Lovelock, Tonopah, and Desert Rock (Nevada Test Site). Upper air data is available in SCRAM for Winnemucca (e.g., Northern Nevada facilities) and Desert Rock (e.g., Southern Nevada facilities).

AERMET is the meteorological pre-processor for AERMOD. Applicants who acquire National Weather Service (NWS) surface and upper-air data, or on-site meteorological data, to support permit modeling efforts should use AERMET for this purpose. If an applicant processes meteorological data using AERMET, a summary of the procedures used in processing the raw data should be included with the environmental evaluation, including a description of the station(s) used, the level of completeness of the raw data prior to AERMET processing, and a description of the surface characteristics of the meteorological data site. The raw meteorological data used by the applicant will be subject to in-house review by the NBAPC.

The U.S. EPA recommends that 5-years (preferably consecutive years) of representative NWS meteorological data be used in AERMOD, or at least 1 year of on-site data (40 CFR Part 51, Appendix W, §8.3.1.2). However, the NBAPC recognizes that NWS data is lacking in many parts of rural Nevada. As such, the NBAPC will determine the appropriateness of meteorological data used by the applicant on a case-by-case basis.

The applicant should use the U.S. EPA's new AERSURFACE utility to derive measurement-site surface characteristics (albedo, Bowen Ratio, and surface roughness) when processing meteorological data using AERMET.

The NBAPC has pre-processed a number of the Nevada NWS and some major-source on-site data for direct use in AERMOD, and these data sets are available to applicants upon request, but it is the responsibility of the applicant to demonstrate that use of these pre-processed data sets are appropriate for their particular facility. Regardless of whether the NBAPC can provide adequate pre-processed data, it is ultimately the responsibility of the applicant to acquire and process sufficient meteorological data to perform a valid modeling analysis (NAC 445B.311.4.(c)).

•Modeling Receptors: The NBAPC requires that modeling protocols submitted by applicants include a discussion of the placement of modeling receptors at the facility boundary (e.g., starting at the fenceline or ambient air boundary) and their spacing and extent outside the facility boundary into publicly-accessible areas. The NBAPC prefers that receptors at the fenceline be placed at intervals of not greater than 25 meters to adequately assess the ambient concentrations at the point of closest public access to the facility.

The NBAPC will evaluate, on a case-by-case basis, the furthest extent and spacing of receptors away from the facility boundary. The modeling protocol should provide a justification as to the extent and spacing of receptors.

The analyst is cautioned that modeling analyses in which the receptor grid is too coarse (e.g., a grid spacing of 250 meters or greater) may miss localized “hot spots” of higher pollutant concentrations. Therefore, it is best to use a denser receptor grid closer to the fenceline (no greater than 50 meters).

Also, please note that, prior making a final decision as to whether to issue or deny a permit, the NBAPC will independently verify whether the receptor grid chosen by the applicant is adequate to identify local hot spots. This may mean that modeling demonstrations received by our office with a “coarse” receptor grid network may have to be re-modeled to assess whether localized “hot spots” have been missed.

The applicant should not generate receptors within their property boundary (model fenceline). A “fenceline” is any tangible physical barrier or limitation to public access (i.e. an actual fence, steep terrain, or berms). The purpose of an ambient standards demonstration is to show that the ambient concentrations will not exceed the Nevada AAQS at publicly-accessible areas. Publicly-accessible areas include locations anywhere on or beyond (e.g., away from the facility) the fenceline. Publicly-accessible areas also include receptors located outside a facility, but on the property of an adjacent and independently-owned and controlled facility. Parking lots are also considered publicly-accessible areas, unless the applicant can demonstrate that the general public is prohibited from parking in them.

For modeling purposes, if the combination of your facility's highest modeled impacts, along with the appropriate background levels, exceeds an ambient standard at public access points, then a modeling exceedance exists. A facility that impacts into the air-shed space of another neighboring facility cannot waive their neighbor's right for access to "clean" air (ambient concentrations below the Nevada AAQS), even if their neighbor's facility is fenced. Therefore, a permitted facility should consider all areas outside their fenceline and/or property boundary as publicly-accessible.

If the facility does not have a discrete boundary to model, then the protocol should discuss what other features are available to adequately restrict public access. Adequate barriers to public access include fencing, safety berms, and steep terrain features such as steep cliffs and deep drainages that will prevent physical access to the property.

Since the ambient air quality standards go down to averaging periods as short as 1 hour (e.g., ozone), even short-term exposure to concentrations that exceed the ambient standards may be grounds for denial of a permit application.

•**Terrain:** AERMOD requires that elevated terrain be considered in air dispersion modeling. The applicant should utilize the appropriate U.S.G.S. Digital Elevation Models (DEMs) for processing in AERMAP. Ideally, 7 ½ - minute DEMs (30m x 30m grid cell) should be used, unless DEMs with higher resolution are available. The project datum must be in NAD 83 UTM coordinates. AERMAP should be used to assign base elevations to all sources, receptors, and buildings, as applicable.

•**Operating Schedule:** For sources that are proposed to operate 24 hours per day, no operating schedule adjustment in AERMOD is necessary. However, for sources that are limited by permit constraints to a schedule of less than 24 hours per day, the use of Hour of Day Emission Rate Scalars (HROFDY) in AERMOD is allowed to modulate emissions, if the applicant so chooses. For any hour that an emission unit is to be operated, emissions must be modeled at their proposed maximum emission rates. HROFDY scalars can be used to account for non-operational hours for short-term averaging periods.

The applicant should not attempt to model insignificant activity sources using HROFDY scalars, because the NBAPC does not have a mechanism to enforce daily operating limits for non-permit equipment.

Please note that the NBAPC does not consider "downscaling" of hourly emission limits to be an appropriate method to account for non-operational hours. Therefore, NBAPC will not accept modeling analyses where it has been determined that the emission rates have been artificially downscaled to demonstrate compliance with ambient standards.

•**Building Downwash:** The NBAPC requires that building downwash be considered in all modeling analyses. For regulatory applications, a building is considered sufficiently close to a stack to cause building wake effects when the distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building. For modeling scenarios meeting these criteria, the user must apply an appropriate algorithm to handle building wake effects on nearby stack (point) sources. In AERMOD, the Building Profile Input Program with Prime (BPIP--PRIME) is the U.S. EPA algorithm used to calculate direction-specific building dimensions and GEP (Good Engineering Practice) stack heights. AERMOD uses the output from BPIP-PRIME to calculate building downwash effects.

•**Background Pollutant Concentrations:** The applicant shall determine appropriate background concentrations based on available ambient monitoring data for the area in question. A background concentration is the current level of ambient air pollution, external to the facility's own impacts, which is the result of other point (industrial facilities), area (residential areas), and mobile (transportation) sources of air pollution.

Background concentrations vary throughout the state, ranging from relatively "pristine" levels, to those that exceed local and National Ambient Air Quality Standards (NAAQS) in federally-designated Nonattainment Areas (e.g., presently as of this writing, certain locations within Clark and Washoe Counties). The NBAPC will evaluate the applicant's choice of background concentrations, and will provide alternative background values, as appropriate.

The environmental evaluation must adequately demonstrate that the numerical addition of the highest, first-high (H1H) concentration of each pollutant (by its respective averaging time) predicted from the facility impacts, along with background concentrations, will not result in an exceedance of any applicable ambient air quality standard in areas to which the public has access.

•**Effects of Nearby Facilities:** Ambient impacts from nearby facilities are to be considered on a case-by-case basis. For instance, if a facility is located sufficiently far from any other stationary source, then it is reasonable to assume background conditions using a nearby ambient monitoring station. However, if two facilities are located on the same property, or are located adjacent to one another, then a general background value cannot be assumed.

Therefore, adjacent facilities must be modeled together. If it is determined by the NBAPC that another facility is sufficiently close to the facility in question, then the NBAPC will provide whatever information it has on file to the applicant, so that emissions from the adjacent facility can be included in the air dispersion modeling analysis.

•Modeling Summary Analysis: Please note that a complete environmental evaluation should include a summary narrative and a tabulation of the highest modeled values (plus background concentrations) to demonstrate compliance with the applicable ambient air quality standards. Simply attaching the model output without any written explanation does not constitute a complete environmental evaluation from the NBAPC's perspective.

•Model Input/Output Files: The applicant will provide on CD-ROM digital copies of all files related to the modeling. These include, but are not limited to, .SFC and .PFL meteorological files, DEM terrain files, files related to BPIP-PRIME runs, geo-referenced image underlays, and, of course, the AERMOD-generated input and output files. The NBAPC requires these files to perform its own check model runs, if necessary. Any permit application that does not have included with it digital modeling files will be deemed incomplete.

•Facility Plot Plan: Applicants are required to provide a detailed facility plot plan with the environmental evaluation. The facility plot plan is a graphical depiction of the location of emission units, facility buildings, fenceline corners, and terrain characteristics. The facility plot plan must have a scale bar and north arrow. A scale bar, rather than a ratio scale, is preferred, because hardcopy printouts of digital files may not be plotted as the same scale as the ratio. One or more UTM control points or a UTM grid (including the datum, NAD 83) may also be useful to have on the facility plot plan. The facility plot plan should be provided in paper and geo-referenced digital format.

## VIII. CONTACT INFORMATION

The applicant may contact Pat Mohn at the Nevada Bureau of Air Pollution Control at 775-687-9345, or at [pmohn@ndep.nv.gov](mailto:pmohn@ndep.nv.gov) for information regarding air dispersion modeling requirements.

Attachment (1) – Table of Nevada Ambient Air Quality Standards (AAQS)

Attachment (2) – NAC 445B.311 (Environmental Evaluations)

# Attachment 1

## NAC 445B.22097 Standards of quality for ambient air. ([NRS 445B.210](#))

1. The table contained in this section lists the minimum standards of quality for ambient air.

		NEVADA STANDARDS <sup>A</sup>		NATIONAL STANDARDS <sup>B</sup>		
POLLUTANT	AVERAGING TIME	CONCENTRATION <sup>C</sup>	METHOD <sup>D</sup>	PRIMARY <sup>C, E</sup>	SECONDARY <sup>C, F</sup>	METHOD <sup>D</sup>
Ozone	1 hour	0.12 ppm (235 µg/m <sup>3</sup> )	Ultraviolet absorption	0.12 ppm <sup>G</sup> (1979 standard)	Same as primary	Chemiluminescence
	8-hour	--	--	0.075 ppm (2008 standard)		
Ozone-Lake Tahoe Basin, #90	1 hour	0.10 ppm (195 µg/m <sup>3</sup> )	Ultraviolet absorption	--	--	--
Carbon monoxide less than 5,000' above mean sea level	8 hours	9 ppm (10,500 µg/m <sup>3</sup> )	Nondispersive infrared photometry	9 ppm (10 mg/m <sup>3</sup> )	None	Nondispersive infrared photometry
At or greater than 5,000' above mean sea level		6 ppm (7,000 µg/m <sup>3</sup> )				
Carbon monoxide at any elevation	1 hour	35 ppm (40,500 µg/m <sup>3</sup> )		35 ppm (40 mg/m <sup>3</sup> )		
Nitrogen dioxide	Annual arithmetic mean	0.053 ppm (100 µg/m <sup>3</sup> )	Gas phase chemiluminescence	53 ppb	Same as primary	Gas phase chemiluminescence
	1 hour	--	--	100 ppb	None	
Sulfur dioxide	Annual arithmetic mean	0.030 ppm (80 µg/m <sup>3</sup> )	Ultraviolet fluorescence	0.03 ppm <sup>H</sup> (1971 standard)	None	Spectrophotometry (Pararosaniline method)
	24 hours	0.14 ppm (365 µg/m <sup>3</sup> )		0.14 ppm <sup>H</sup> (1971 standard)		
	3 hours	0.5 ppm (1,300 µg/m <sup>3</sup> )		None	0.5 ppm	
	1 hour	--		75 ppb	None	
Particulate matter as PM <sub>10</sub>	Annual arithmetic mean	50 µg/m <sup>3</sup>	High volume PM <sub>10</sub> sampling	None	None	--
	24 hours	150 µg/m <sup>3</sup>		150 µg/m <sup>3</sup>	Same as primary	High or low volume PM <sub>10</sub> sampling
Particulate matter as PM <sub>2.5</sub>	Annual arithmetic average	--	--	15.0 µg/m <sup>3</sup>	Same as primary	Low volume PM <sub>2.5</sub> sampling
	24-hour	--	--	35 µg/m <sup>3</sup>	Same as primary	
Lead (Pb)	Nevada: Quarterly arithmetic mean; National: Rolling 3 mo. average	1.5 µg/m <sup>3</sup>	High volume sampling, acid extraction and atomic absorption spectrometry	0.15 µg/m <sup>3</sup>	Same as primary	High volume sampling, acid extraction and atomic absorption spectrometry
Hydrogen sulfide	1 hour	0.08 ppm (112 µg/m <sup>3</sup> ) <sup>J</sup>	Ultraviolet fluorescence	--	--	--

### Notes:

Note A: The Director shall use the Nevada standards in considering whether to issue a permit for a stationary source and shall ensure that the stationary source will not cause the Nevada standards to be exceeded in areas where the general public has access.

Note B: The National standards are used in determinations of attainment or nonattainment. The form of a National standard is the criteria which must be satisfied for each respective concentration level of a

standard for the purposes of attainment. The form for each National standard is set forth in 40 C.F.R. Part 50 and may be viewed at <http://www.epa.gov/air/criteria.html>.

Note C: Where applicable, concentration is expressed first in units in which it was adopted. All measurements of air quality that are expressed as mass per unit volume, such as micrograms per-cubic meter, must be corrected to a reference temperature of 25 degrees Centigrade and a-reference pressure of 760 mm of Hg (1,013.2 millibars); “ppm” in this table refers to parts per-million by volume, or micromoles of regulated air pollutant per mole of gas; “µg/m<sup>3</sup>” refers to-micrograms per cubic meter.

Note D: Any reference method specified in accordance with 40 C.F.R. Part 50 or any reference method or equivalent method designated in accordance with 40 C.F.R. Part 53 may be substituted.

Note E: National primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

Note F: National secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a regulated air pollutant.

Note G: The EPA revoked the National 1-hour ozone standard as it applies to all areas. However, anti-backsliding provisions in Federal law require certain areas to have continuing obligations under the National 1-hour ozone standard.

Note H: The 1971 National sulfur dioxide standards remain in effect for an area until 1 year after the area is designated for the 2010 National sulfur dioxide standard, except that in an area designated nonattainment for the 1971 National sulfur dioxide standards, the 1971 standards remain in effect until an implementation plan to attain or maintain the 2010 National sulfur dioxide standards is approved.

Note I: The ambient air quality standard for hydrogen sulfide does not include naturally occurring background concentrations.

2. These standards of quality for ambient air are minimum goals, and it is the intent of the Commission in this section to protect the existing quality of Nevada’s air to the extent that it is economically and technically feasible.  
[Environmental Comm’n, Air Quality Reg. §§ 12.1-12.1.6, eff. 11-7-75; A and renumbered as § 12.1, 12-4-76; A 12-15-77; 8-28-79; §§ 12.2-12.4, eff. 11-7-75; § 12.5, eff. 12-4-76; A 8-28-79]—(NAC A 10-19-83; 9-5-84; 12-26-91; 10-30-95; R103-02, 12-17-2002; R198-03, 4-26-2004; R038-12, 9-14-2012)

## **Attachment 2**

### **NAC 445B.311 Environmental evaluation: Contents; consideration of good engineering practice stack height. ([NRS 445B.210](#), [445B.300](#))**

1. An environmental evaluation which is required for a new or modified stationary source pursuant to [NAC 445B.308](#) to [445B.314](#), inclusive, or as required by the Director must contain a careful and detailed assessment of the environmental aspects of the proposed stationary source and must also contain:

- (a) The name and address of the applicant;
- (b) The name, address and location of the stationary source;
- (c) A description of the proposed stationary source, including the normal hours of operation of the facility and the general types of activities to be performed;
- (d) A map showing the location of the stationary source and the topography of the area, including existing principal streets, roads and highways within 3 miles of the stationary source;
- (e) A site plan showing the location and height of buildings on the site;
- (f) Any additional information or documentation which the Director deems necessary to determine the effect of the stationary source on the quality of the ambient air, including measured data on the quality of the ambient air and meteorological conditions at the proposed site before construction or modification; and
- (g) A dispersion analysis of each regulated air pollutant.

2. Where approval is sought for stationary sources to be constructed in phases, the information required by subsection 1 must be submitted for each phase of the construction project.

3. An environmental evaluation must also consider good engineering practice stack height. If the Director considers an analysis of a source based on a good engineering practice stack height that exceeds the height specified in paragraph (a) or (b) of subsection 1 of [NAC 445B.083](#), the Director shall:

- (a) Notify the public of the availability of the demonstration study performed pursuant to paragraph (c) of subsection 1 of [NAC 445B.083](#); and
- (b) Provide an opportunity for a public hearing on the demonstration study in accordance with the requirements for a Class I operating permit set forth in subsections 7, 9 and 10 of [NAC 445B.3395](#).

4. A dispersion analysis used to determine the location and estimated value of the highest concentration of each regulated air pollutant must include:

(a) A dispersion model based on the applicable models, bases and other requirements specified in the “Guideline on Air Quality Models,” which is Appendix W of 40 C.F.R. Part 51, as adopted by reference in [NAC 445B.221](#), except that the Director may authorize the modification of a model specified in the “Guideline on Air Quality Models” or the use of a model not included in the “Guideline on Air Quality Models” if the Director determines that the modification or use is appropriate;

(b) A narrative report describing:

(1) If applicable, assumptions and premises used in the analysis, including, without limitation:

- (I) Model options chosen;
- (II) Urban versus rural selection;
- (III) Background concentrations;
- (IV) Characterization of emission sources as point, area or volume;
- (V) Emission discharge points; and
- (VI) Rate of emission from each emission unit; and

(2) The geographic area considered in the analysis, including, without limitation, information concerning:

- (I) The nearest significant terrain features;
- (II) The receptor grid or grids; and
- (III) Restrictions on public access to the stationary source; and

(c) Valid meteorological information pursuant to the provisions of Appendix W of 40 C.F.R. Part 51, as adopted by reference in [NAC 445B.221](#), which:

(1) For sources that are not subject to the permitting requirements of 40 C.F.R. § 52.21, as adopted by reference in [NAC 445B.221](#):

(I) Is site specific, if the information exists pursuant to subsection 1 of this section or subsection 7 of [NAC 445B.308](#), and which covers a period of not less than 1 year;

(II) Has been obtained from an off-site location representative of the proposed site and which covers a period of not less than 1 year;

(III) Represents the worst-case meteorological conditions, as approved by the Director for synthetic data; or

(IV) Has been obtained over the last 5 years at the nearest National Weather Service site; or

(2) For sources that are subject to the permitting requirements of 40 C.F.R. § 52.21, as adopted by reference in [NAC 445B.221](#), is representative of the source site location and source emissions and which covers a period of not less than 1 year.

[Environmental Comm’n, Air Quality Reg. § 13.4.1, eff. 11-7-75; A 12-15-77; renumbered as § 13.3.1, 8-28-79; § 13.4.1.1, eff. 11-7-75; A 12-15-77; renumbered as § 13.3.1.1, 8-28-79; § 13.4.1.4, eff. 11-7-75; renumbered as § 13.3.1.2, 8-28-79]—(NAC A 10-30-95; R103-02, 12-17-2002; R096-05, 10-31-2005; R151-06, 9-18-2006)